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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/AIV/2014-15 12.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	12.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	383	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.93	22.02	21.98

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

Note:

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/AIV/2014-15 12.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	12.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	384	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	22.14	22.54	22.34

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Shape_T/2014-15 12.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	12.07.2014

Result : Flakiness Index = **11.36%**

Elongation Index = **13.52%**

Result : Combined Flakiness & Elongation index **24.88%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Shape_T/2014-15 12.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	12.07.2014

Result : Flakiness Index = **11.64%**

Elongation Index = **13.75%**

Result : Combined Flakiness & Elongation index **25.39%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Stripping/2014-15 15.07.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	15.07.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.4	2.60	97.40
2	2.6		
3	2.8		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.07/SDBC/Sp_Wa/2014-15 15.07.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	15.07.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2022	2025	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1271	1272	1275	
4	Weight of saturated surface dry aggregate in air	W_3 g	2040	2042	2045	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	769	770	770	
6	Weight of oven dried aggregate	W_4 g	2025	2023	2028	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.633	2.627	2.634	2.631
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.686	2.694	2.693	2.691
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.74%	0.94%	0.84%	0.84%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Bit/2014-15 15.07.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
REFERENCE	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
SAMPLE I/D	Roads in Ajjana, Muneshwara Layout Ward No.07, BBMP, Bangalore.
DATE OF TESTING	15.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	477.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	22.50
7. Bitumen content in %	5.00	4.50
8. Average	**4.75**	

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Bit/2014-15 15.07.2014

BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana Muneshwara Layout, BBMP, Bangalore.
REFERENCE	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
SAMPLE I/D	Roads in Ajjana, Muneshwara Layout Ward No.07, BBMP, Bangalore.
DATE OF TESTING	15.07.2014

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	28.32	5.96	5.96	94.04	90-100
4.75	263.2	55.41	61.37	38.63	35-51
2.36	57.45	12.09	73.47	26.53	24-39
1.18	39.58	8.33	81.80	18.20	15-30
0.3	27.13	5.71	87.51	12.49	9-19
0.075	28.96	6.10	93.61	6.39	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	35.48	7.43	7.43	92.57	90-100
4.75	261.4	54.74	62.17	37.83	35-51
2.36	53.46	11.20	73.37	26.63	24-39
1.18	35.42	7.42	80.79	19.21	15-30
0.3	31.78	6.66	87.44	12.56	9-19
0.075	27.89	5.84	93.28	6.72	3-8

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Bitumen/2014-15 15.07.2014

BITUMEN DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
REFERENCE	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
SAMPLE I/D	Roads in Ajjana, Muneshwara Layout, Ward No. 07
DATE OF TESTING	15.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	475
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	25.00
7. Bitumen content in %	5.20	5.00
8. Average	5.10	

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Gradation/2014-15 15.07.2014

GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
REFERENCE	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
SAMPLE I/D	Roads in Ajjana, Muneshwara Layout, Ward No. 07
DATE OF TESTING	15.07.2014

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	22.52	4.75	4.75	95.25	90-100
4.75	248.63	52.45	57.20	42.80	35-51
2.36	54.12	11.42	68.62	31.38	24-39
1.18	50.27	10.61	79.23	20.77	15-30
0.3	26.32	5.55	84.78	15.22	9-19
0.075	41.25	8.70	93.48	6.52	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	36.25	7.63	7.63	92.37	90-100
4.75	252.34	53.12	60.76	39.24	35-51
2.36	51.78	10.90	71.66	28.34	24-39
1.18	42.13	8.87	80.53	19.47	15-30
0.3	27.45	5.78	86.31	13.69	9-19
0.075	33.24	7.00	93.30	6.70	3-8

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/AGG/2014-15 15.07.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
Reference	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	15.07.2014

Total Weight of Sample: **5650** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	472	8.4	8.35	91.65	90-100	
4.75	2856	50.5	58.90	41.10	35-51	
2.36	716	12.7	71.58	28.42	24-39	
1.18	432	7.6	79.22	20.78	15-30	
0.3	364	6.4	85.66	14.34	9-19	
0.075	415	7.3	93.01	6.99	3-8	

Total Weight of Sample: **5600** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	394	7.0	7.04	92.96	90-100	
4.75	2968	53.0	60.04	39.96	35-51	
2.36	631	11.3	71.30	28.70	24-39	
1.18	428	7.6	78.95	21.05	15-30	
0.3	358	6.4	85.34	14.66	9-19	
0.075	467	8.3	93.68	6.32	3-8	

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Stability/2014-15 15.07.2014

TEST REPORT ON STABILITY OF MIX

Client	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	:	Improvements of Roads at Ward No.07, Byatarayanapura in Ajjana, Muneshwara Layout, BBMP, Bangalore.
Reference	:	AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Semi Dense Bituminous Concrete
Date of Testing	:	15.07.2014

The results of the tests conducted on the bituminous mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, at 60° C, Kn	9.50	10.15	8.2 Kn (min)
2	Marshal flow at 60° C, mm	3.15	2.90	2 – 4
3	Percent air voids	4.80	3.65	3 – 5
4	Percent voids in mineral aggregates (VMA %)	13.35	14.70	13 - 15
5	Percent voids filled with Bitumen (VFB %)	72.20	73.25	65 – 78
6	Density, g/cc	2.27	2.26	---

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⇒ The results indicated above are based on the tests carried out on the samples received in the laboratory.

⇒ Any Query regarding the report must be reported within 15 days from the date of testing.

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